

ACTION DESCRIPTION MEMORANDUM  
FOR  
PRESENT LANDFILL CLOSURE

Rockwell International  
Aerospace Operations  
Rocky Flats Plant

Operating Contractor

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Rocky Flats Area Office

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## 1.0 PROPOSED LANDFILL CLOSURE

The proposed closure of the present landfill, an interim status unit under the Resource Conservation and Recovery Act (RCRA), will involve a variety of activities including soil analyses, grading, cap placement, vegetative cover establishment, maintenance, and groundwater collection system installation and evaluation. The closure activities proposed by the U.S. Department of Energy (DOE) are designed to the extent necessary to protect human health and the environment. The facilities included in the landfill closure include the following Solid Waste Management Units (SWMUs):

<u>SWMU #</u>	<u>Description</u>
114	Present Landfill
167.1	North Area Sprayfield

Closure activities will be conducted in accordance with all applicable NEPA regulations (DOE, 1981, 1988).

## 1.1 OBJECTIVES OF LANDFILL CLOSURE

Landfill closure will meet the performance standards of 6 CCR 1007.3, Section 265.111. The objectives of these standards require that closure be accomplished in a manner that:

- o minimizes the need for further maintenance, and
- o controls, minimizes or eliminates, to the extent necessary to protect human health and environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall,



or waste decomposition products to the ground or surface waters or to the atmosphere.

## 1.2 BACKGROUND

The present landfill covers somewhat less than 765,000 square feet in the north central portion of the Rocky Flats facility, on an unnamed tributary to North Walnut Creek. The present landfill began operations 14 August 1968. Currently, the landfill is accepting approximately 115 cubic yards of nonhazardous solid waste per work day. It is anticipated that this volume will continue to be disposed through October, 1988, then diminish until landfill operations cease in 1989. The total volume of waste material disposed in the landfill when operations cease will be approximately 410,000 cubic yards under a surface area of about 765,000 square feet.

In September 1973, tritium was detected at the drainage of the Rocky Flats landfill. In response, 57 monitoring wells were installed directly into the landfill waste or immediately below the waste materials. In addition, two temporary berms for ponding were constructed to provide management capability for any leachate or surface water generated by the landfill. The two ponds were named Pond #1 and Pond #2, and were located east of the landfill. These ponds consisted of a drainage barrier across the channel, which reduced the flow in the tributary. There was a sprinkler pumping station located adjacent to the west pond, Pond #1.

Several options were evaluated for the correction of the tritium problem, including excavation. The selected action was to construct a series of collection systems around the landfill.

Areas where disposal has been completed to maximum depth have been covered with approximately three feet of compacted soil to reduce

wind dispersion and infiltration of the landfill materials. This soil layer currently supports only limited vegetative cover.

### 1.3 NEED FOR THE ACTION

To identify appropriate closure activities and technologies, it was necessary to characterize the land-filled materials and site environs. During a 1986-1987 waste stream identification study (Rockwell International, 1986a, b, c, d) 338 waste streams were being sent to the landfill for disposal. Included were 241 waste streams considered nonhazardous (office trash, empty cans and containers, used filters, various electrical components, dried sanitary sewage sludge, solid sump sludge, and other miscellaneous sludges) and 97 solid waste streams containing hazardous waste or hazardous constituents. The waste streams identified as hazardous fell into four general categories, i.e., 1) containers partially filled with paint, solvents, degreasing agents, and foam polymers; 2) Kimwipes and rags contaminated with the same materials; 3) silicon oil filters, paint filters, oil filters, and other used filters which may have contained hazardous constituents; and 4) metal cuttings and shavings, mineral and asbestos dust, and miscellaneous metal chips coated with hydraulic oil and carbon tetrachloride. The tritium source was introduced into the landfill in 1970. Tritium was no longer detected in concentrations above the range of background levels in groundwater monitoring samples by 1974. Landfill closure will be carried out under the Compliance Agreement between the United States Environmental Protection Agency (EPA), the United States Department of Energy (DOE) and the Colorado Department of Health (CDH) established in August 1986.



#### 1.4 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The activities necessary to complete closure and comply with the long-term monitoring and groundwater corrective action requirements of 6 CCR 1007-3 264 Subpart F include the following elements of the Proposed Action:

- o Analysis of north sprayfield area,
- o Grading of the landfill,
- o Placement of the cap,
- o Placement of a vegetative cover,
- o Maintenance of the closed area,
- o Evaluation of existing groundwater collection system, and
- o Installation of a groundwater collection system.

##### 1.4.1 Analysis of the North Sprayfield Area

Water from the west pond, derived from surface runoff, collected groundwater, and landfill-generated leachate was applied over a period of seven years to the north sprayfield area (280 feet by 480 feet) via a sprinkler pumping station and spray lines. Random soil samples will be taken from the north sprayfield and analyzed to determine if contamination has occurred, prior to installation of the final cap and cover of the landfill. Soil samples will be analyzed for Volatile Organic Compounds (EPA 625), Metals, and Radionuclides. In addition, a direct gamma radiation survey will be conducted using the FIDLER field instrument. Additional information for the soil sampling activity is presented in the Closure Plan (Rockwell International, 1988).

#### 1.4.2 Landfill Grading

The existing landfill surface will be regraded to divert surface runoff on the land-fill to the center of the top portion, down the eastern face, and into the east pond. Perimeter grading around the landfill to provide an approximately two foot high berm will be performed to provide additional runoff control for the landfill for storm events exceeding the one-hour, 100-year design storm. The final cover elevations will be based on actual ground surface of the landfill at the time of final design.

#### 1.4.3 Cap Placement

The design of a multi-layered cap will conform to the performance standards in 6 CCR 1007-3, Section 265.310. This final cover is designed to provide long-term minimization of liquids migration through the landfill, require minimum maintenance, promote drainage and reduce erosion or abrasion of the cover, accommodate settling and subsidence to maintain cover integrity, and have a permeability equal to any bottom liner or natural subsoils present. The final cover will extend beyond the existing landfill boundary (approximately 845,000 square feet) and will contain a gas collection component. Cover materials will include:

- o Sand - hard, durable sands or gravels having no more than 5 percent passing the U.S. standard no. 200 sieve.
- o Interim Cover - on-site, clayey soils with some asphalt and concrete construction debris.
- o Compacted Soil - on-site, clayey soils classifying as A-6 and A-7 (AASHTO).



- o Topsoil - on-site soils spread over the area to be vegetated.
- o Riprap - hard, durable rock (8-inch to 18-inch) imported to the site to place in the discharge area of the eastern landfill face.
- o Synthetic Membrane - 30-mil high density polyethylene synthetic membrane to be placed above the gas collection layer and below the sand drain.

Materials depth are approximately 12-inches for topsoil; 24-inches for compacted on-site soil; 6-inches for the sand drain layer; and a 6-inch sand layer underlying the synthetic membrane. Interim soil cover over the landfill will be between 3- and 9-feet in depth. Additional cover and infiltration control information is supplied in the Closure Plan (Rockwell International, 1988).

#### 1.4.4 Vegetation Establishment

The total area requiring revegetation will be approximately 850,000 square feet where a mixture of grass seed (14 lbs/acre pls) will be introduced. The mixture to be used includes western wheatgrass, thickspike wheatgrass, little bluestem, green needlegrass, and Canby or Canada bluegrass. These grasses have shallow root systems that will not penetrate the cover, require no irrigation, are temperature adapted, require little/no fertilization, and are compatible with site soils.

#### 1.4.5 Final Cover Maintenance

Maintenance of the cover will include filling and regrading of surface erosion and reseeding to maintain the vegetative cover. If required, replacement of riprap material on the face of the



embankment will be performed. Gas ventilation pipes will be repaired or replaced as required to provide positive ventilation. Details of cover maintenance are presented in the post-closure care permit.

#### 1.4.6 Evaluation of the Existing Groundwater Collection System

A groundwater collection system was installed around the landfill in 1974 as part of a landfill expansion and was extended in 1982 for further expansion. The system was designed to reduce migration of groundwater into the landfill area and no provisions were made for collection and diversion. The system is considered only partially effective (Rockwell International, 1988).

A leachate collection system was constructed in 1974 and was subsequently covered by landfill wastes. The original discharge points were covered during expansion of the landfill. The leachate collection system is not currently lowering water levels within the landfill.

#### 1.4.7 Installation of a Groundwater Collection System

The landfill has had an effect on groundwater quality, contains a relatively high water level within the landfill, and could result in additional water quality effects due to closure activities. The groundwater collection system will be constructed at the downstream toe of the final landfill cover. The collection system will be a gravel drain excavated through the surface colluvial and alluvial material into the underlying claystone bedrock. The drain will lower water levels within the landfill and collect potentially impacted groundwater flows within the surface soils and shallow bedrock. Collected water will be pumped to the east pond area for storage and evaporation. The east pond will be operated as a zero

discharge impoundment to surface drainage for the 100-year, 24-hour storm event following landfill closure.

Variations in water quality, if sufficient to require treatment of stored water, will result in the construction of a treatment system on-site. Water quality will be monitored through the existing monitoring well system currently in place. Over fifty wells have been drilled and will be sampled on a quarterly basis. The east pond will also be sampled quarterly at both the east and west margins.

#### 1.4.8 Alternative Actions

In addition to the proposed action, it may be necessary to consider alternatives based on sampling results of the north sprayfield area. It is anticipated that the sampling program will show that the sprayfield area has not been contaminated. However, if the field work indicates the sprayfield has been contaminated, remedial alternatives will be evaluated, based on types of contaminants present. Alternatives include:

- In-place treatment of contaminated soils.
- Removal of contaminated soils, with disposal in the present landfill.
- Removal of contaminated soil with off-site disposal.
- Closure of the sprayfield with the contaminated soils left in place.

Should the No Action alternative be implemented, a variety of environmental consequences would occur and at a minimum include:



- Local long-term impact to water quality.
- Erosion due to lack of vegetative cover.
- Infiltration by precipitation collected on the landfill surface.
- Lack of runoff/runoff controls.
- In-place closure of the north sprayfield.
- Surveillance wells monitoring performance.
- Impacts from natural phenomena such as heavy rainfall, earthquake, and tornadoes.

## 2.0 LOCATION OF THE ACTION

The Rocky Flats Plant is located in northern Jefferson County approximately 16 miles northwest of downtown Denver, Colorado. The immediate area around Rocky Flats is primarily agricultural or undeveloped land, with the population centers of Boulder, Broomfield, Golden, and Arvada located within 12 miles of the facility. A detailed description of the local demographics and environment is presented in the Rocky Flats Plant Site Final Environmental Impact Statement (DOE, 1980).

The present landfill is located in the north-central area of the Rocky Flats facility, occupying the western terminus of an unnamed tributary draining into North Walnut Creek. This site represents the primary location for any closure activities undertaken. Activities associated with closure of the landfill will occur totally within the plant boundaries (an exception being the introduction of off-site cover materials such as gravel/soil) and



will be controlled by appropriate facility procedures and in compliance with appropriate environmental regulations.

### 3.0 ENVIRONMENTAL ISSUES

Closure of the landfill will involve a variety of activities comprising the proposed action and include soil analyses, landfill grading, cap placement, vegetative cover establishment, maintenance following closure, groundwater collection system evaluation, and installation of a new groundwater collection system. The proposed action is intended to enhance the local ecosystem and reduce the potential for public health hazards. However, implementation of the action proposed may result in other potential impacts from routine operations or accidents. These are primarily on-site landfill management activities, an exception being the potential for introducing sand/gravel/riprap from off-site to fulfill cover and cap needs.

### 3.1 ENVIRONMENTAL EFFECTS

#### 3.1.1 Air Quality

Dust and soil particles may be moved from the landfill cap and north sprayfield area by wind, having a negligible to low short-term impact to local air quality. This impact will be abated as vegetative cover is established. Windy conditions can be expected as a result of thunderstorms, chinook winds, and the extremely rare tornadic winds. Suspension of dust and soil will be controlled to the extent necessary through dust suppression techniques, and will have little environmental impact. The effectiveness of these techniques will be evaluated through ambient air monitoring to ensure adequate control measures are being taken. A small amount of vehicle emissions will be produced during closure activities.

### 3.1.2 Soils

Negligible impacts to the soils on-site will occur because of regrading and redistribution of previously disturbed, stockpiled soil. Low to moderate impacts will result if soil removal from the north sprayfield is required. Erosion of the soil, prior to vegetative cover establishment, is expected to be low.

### 3.1.3 Water Quality

Landfill closure is expected to have negligible to low impacts to surface water quality, because runoff will be collected and allowed to evaporate from holding structures. Groundwater is currently receiving low to moderate impacts from landfill leachate, which will be reduced to negligible as closure is achieved and the major source of contamination is removed.

### 3.1.4 Cultural Resources

Closure activities will have no impact on archaeological and/or historic resources. The State Office of Archaeology and Historic Preservation has stated that the areas within the 384-acre security-fenced zone are so highly disturbed that little cultural resource information would be available. A class II survey was conducted during the summer of 1988 on the remainder of the 6200-acre plant site, and no unique sites or sites considered eligible for nomination to the National Register of Historic Places were discovered (Burney and Associates, 1988).

### 3.1.5 Biological Resources

This closure activity will have negligible impacts on vegetation as the area is graded and prepared for cap placement and



runon/runoff controls. Vegetation is relatively limited around the project area.

The U.S. Fish and Wildlife Service has listed two endangered species as potentially existing in the Rocky Flats area. These species are the black-footed ferret and the bald eagle. This project will not affect either species.

#### 3.1.6 Land Use

Closure will require a small amount of additional land to establish the cap and storage pond resulting in a low impact to vegetation and soils adjacent to the site. The activities are within existing Plant boundaries and will not adversely impact agricultural or recreation areas. Closure will tend to enhance the local environment and limit potential adverse environmental effects from contaminant migration off-site to agricultural areas or population centers.

#### 3.1.7 Wetlands

The landfill site does not occupy wetland habitat; therefore closure will have no effect on wetland resources.

### 3.2 HEALTH AND SAFETY

Landfill closure actions will conform to all applicable health, safety, and environmental requirements. The Plant maintains an ongoing environmental surveillance program as required by DOE orders. Monitoring and sampling locations will be augmented to ensure compliance with environmental requirements for the remedial actions taken. Major environmental issues include:



- 1) Occupational Exposure - Buried waste site improvements and/or contaminated waste treatment will result in occupational exposure to toxic substances and possibly to trace amounts of radioactive materials. Appropriate field operations and waste-handling procedures will be used to minimize this exposure.
- 2) Nonoccupational Exposure - Implementing actions will be directed towards preventing potential exposure to the public from contaminants which have the potential to migrate beyond site boundaries. Construction activities will be managed to limit airborne contaminants resulting from excavation work and any waste processing effluents will be controlled in accordance with existing facility policies and environmental requirements.
- 3) On-site Transportation - Any on-site transportation of waste will be by truck. Impacts other than those normally incident to transportation (e.g., pollution, potential for injuries or fatalities), include the potential for occupational exposure to toxic substances. On-site transportation activities will be managed to minimize attendant occupational risks. There is essentially no hazard to the public health since the subject transportation activities will occur within Plant boundaries.
- 4) Accidents and Natural Phenomena - The potential exists for impacts to occur from equipment failures and operator errors as well as from natural phenomena (e.g., tornadoes, high winds, heavy rainfall). Such events are expected to have a very low frequency of occurrence.

- 5) Long-Term Environmental Quality - There are several individual issues associated with contamination treatment and confinement actions. Associated with both closure categories is establishment of appropriate surveillance and reporting practices. This includes monitoring well placement, frequency and method of sampling, and duration of sampling. Also of issue are potential impacts from intrusive actions by burrowing animals and vegetation. Waste management operations will perform periodic inspections and repairs to mitigate such occurrences. Confinement alternatives raise the issue of loss of institutional control and potential impacts from subsequent intrusion by man.

The majority of the landfill has an interim three-foot soil cover. This cover minimizes potential direct contact and wind dispersal of contaminated material and reduces contamination of runoff. Surface runoff, sediments and groundwater are collected by the east pond. Groundwater at the landfill is sampled quarterly from monitoring wells. These specific measures at the landfill protect human health and the environment from threats posed by the landfill. The monitoring and security measures (fencing, security patrols, and camera surveillance) are designed to protect human health from the threats posed by the Plant and its operations as a whole, as well as from threats posed by the present landfill.

#### 4.0 REFERENCES

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Rockwell International. 1986a. "Waste Stream Identification, Rocky Flats Plant, Area 1," W.O. 2029-13-04-0001.

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